Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (currently amended) An image processor comprising:

~~an image~~ a primary detector array having a plurality of detector elements sensitive to an input image so as to ~~for producing~~ produce an image signal ~~from an image received thereat~~;

~~oscillation~~ means ~~coupled to the image detector~~ for inducing a spatial oscillation in the input image relative to ~~the image detector~~ the primary detector array, whereby the image signal possesses a spatio-temporal motion signature of the induced oscillation; ~~and~~

a secondary array of opponent center/surround detectors, each center/surround detector fed by one or more detectors from the primary detector array so as to extract improved contrast and motion information;

means for calibrating each detector in the primary detector array with respect to neighboring one or more detectors in the primary and secondary detector arrays using the image signal during the oscillation; and

a spatio-temporally matching filter spatio-temporally matching the oscillation in communication with the image detector and the oscillation means for providing enhanced image processing of the image, the matching filter being configured to filter out aspects of the image signal not associated with the induced oscillation, for filtering the image signal according to the spatio-temporal motion signature of the induced oscillation to extract those elements whose motions reflect the induced oscillation.

2. (currently amended) The image processor according to claim 1, wherein ~~the oscillation means is configured to induce~~ the spatial oscillation is provided ~~via~~ by a swept-frequency sinusoid chirp.

3. (cancelled).

4.(cancelled).

5. (currently amended) The image processor according to claim 4, wherein ~~the secondary detectors comprise opponent center/surround detectors,~~ a central detector ~~of each~~ in said opponent center/surround detectors ~~being~~ is configured to receive a signal input from one of the detector elements in the primary detector array, and wherein a surround detector ~~of each~~ in said opponent center/surround detectors ~~being~~ is configured to receive a signal input of opposing polarity from an adjacent one of the detector elements in the primary detector array adjacent to the primary center detector for that secondary opponent center/surround detector.

6. (currently amended) The image processor according to claim ~~5~~ 1, ~~wherein the filter is configured to~~ ~~extract~~ comprising means for extracting phase information of elements ~~of the image~~ crossing secondary array detector boundaries ~~of the opponent center/surround detectors for providing~~ to provide at least one of increased spatial and motion accuracy ~~of the image detector~~.

7. (currently amended) The image processor according to claim ~~5~~ 1, ~~wherein the filter is configured to detect~~ comprising a Doppler shift detector for detecting Doppler ~~frequency~~ shifts of ~~elements of the image~~ ~~crossing the opponent/center detectors~~ opponent detector crossing frequencies for extracting real-time velocity information of ~~the image~~ elements crossing secondary array detector boundaries during the induced oscillation.

8. (currently amended) The image processor according to claim ~~5~~ 1, wherein ~~the filter is configured to time instances of the image crossing boundaries of the opponent/center detectors~~ the means for inducing a spatial oscillation has one or more motionless periods in which no oscillation is induced, the system comprising means for direct timing of detector crossings during ~~a~~ the motionless period ~~of the detector~~ for extracting one of real-time velocity information and position information of ~~the image thereat~~ elements crossing secondary array detector boundaries during the induced oscillation.

9. (currently amended) The image processor according to claim 1, ~~wherein the filter is configured to perform~~ comprising means for performing a first coarse ~~analysis~~ scan of the image, and subsequently a finer analysis of the image ~~of~~ at edges detected by the first coarse ~~analysis~~ scan to provide improved imaging efficiency.

10. (currently amended) The image processor according to claim 1, ~~wherein the filter is configured to~~ comprising means for ~~extract~~ extracting real-time, systematic detector-to-detector sensitivity variation information to provide relative calibration of the primary and secondary detector arrays ~~elements~~.

11.(currently amended) The image processor according to claim 1, wherein the filter is configured to comprising means for suppressing between oscillation periods of the detector an output of those of the detector elements not reporting motion of the image those of the opponent detectors indicating the latest positions of static edges found during one of the induced oscillation periods, and to increase sensitivity of those of the detector elements reporting real motion of the image between the oscillation periods.

12. (currently amended) The image processor according to claim 1, ~~wherein the filter is configured to extract~~ comprising means for extracting information pertaining to various motion spectra ~~information~~ sampled at various orientations and/or scales, of different textures exposed to the ~~image~~ detector array, derived from the relative motions on each orientation, of the textures upon the detector array.

13. (cancelled).

14. (currently amended) The image processor according to claim ~~3~~ 1, wherein the ~~image~~ detector array is configured to control at least one of a sensitivity and an integration time of at least one of the detector elements for extending a dynamic range of the ~~image~~ detector array.

15. (currently amended) The image processor according to claim ~~3~~ 1, wherein the filter is configured to cancel output differences between adjacent ones of the detector elements during the induced oscillation ~~of the image detector~~.

16. (currently amended) A method of image processing comprising the steps of:

~~providing a continuous image signal by~~ spatially oscillating an image ~~relative to an image detector~~ in one or more dimensions relative to a primary detector array sensitive to an input image so as to produce an image signal possessing a spatio-temporal motion signature of the induced oscillation;

feeding each of a secondary array of opponent center/surround detectors from one or more detectors from the primary detector array so as to extract improved contrast and motion information;

calibrating each detector in the primary and secondary detector arrays with respect to neighboring one or more detectors in the primary and secondary detectors using the image signal during the oscillation; and

filtering the image signal according to the spatio-temporal motion signature of the induced oscillation to extract those elements whose motions reflect the induced oscillation ~~with reference to the spatial oscillation, filtering out aspects of the image signal not associated with the spatial oscillation~~.

17. (currently amended) The method according to claim 16, wherein the spatial oscillation ~~step comprises spatially oscillating the image with~~ is provided by a swept-frequency sinusoid chirp.

18. (currently amended) The method according to claim 16, ~~wherein the filtering step comprises~~ comprising extracting differential image information from the image.

19. (cancelled).

20. (currently amended) The method according to claim 19 16, wherein the secondary detector comprises a plurality of opponent center/surround detectors, and the filtering step comprises comprising increasing at least one of spatial and motion accuracy of the image detector by extracting phase information of elements of the image crossing secondary array detector boundaries of the opponent center/surround detectors to provide one or more of increased spatial accuracy and velocity accuracy.

21. (currently amended) The method according to claim ~~19~~ 16, ~~wherein the secondary detector comprises a plurality of opponent center/surround detectors, and the filtering step comprises~~ comprising detecting Doppler shifts of opponent crossing frequencies for extracting real-time velocity information of ~~the image by detecting Doppler frequency shifts of~~ elements ~~of the image~~ crossing ~~the opponent/center detectors~~ secondary array detector boundaries during the induced oscillation.

22. (currently amended) The method according to claim ~~19~~ 16, ~~wherein the secondary detector comprises a plurality of opponent center/surround detectors, and the filtering step comprises~~ comprising timing detector crossings during periods in which no oscillation is induced, for extracting at least one of real-time position and velocity information of elements crossing secondary array detector boundaries during the induced oscillation ~~the image by timing instances of elements of the image crossing boundaries of the opponent/center detectors during a motionless period of the image detector~~.

23. (currently amended) The method according to claim 16, ~~wherein the filtering step comprises providing improved imaging efficiency by~~ comprising performing a first coarse scan ~~analysis of the image~~, and subsequently a finer ~~analysis~~ scan ~~of the image~~ of edges detected by the first coarse ~~analysis~~ scan to provide improved imaging efficiency.

24. (currently amended) The method according to claim ~~19~~ 16, ~~wherein the filtering step comprises calibrating the detector elements by~~ comprising extracting real-time, systematic detector-to-detector sensitivity variation information from the image signal to provide relative calibration of the primary and secondary detector arrays.

25. (currently amended) The method according to claim 19 16, wherein the filtering step comprises comprising suppressing between oscillation periods of the image detector an output of those of the detector elements reporting those of the opponent detectors indicating the latest positions of [[a]] static edges of the image found during one of the induced oscillation periods, and increasing sensitivity of those of the detector elements reporting real motion of the image between the oscillation periods.

26. (currently amended) The method according to claim 16, ~~wherein the filtering step comprises~~ further comprising extracting information pertaining to various motion spectra sampled at various orientations and/or scales ~~spectra information associated with~~ of different textures exposed to the ~~image detector~~ detector array, derived from the relative motions in each orientation, of the textures upon the detector array.

27. (cancelled)

28. (new) The image processor according to claim 1, comprising a reference black surrounding the perimeter of the primary detector array.

29. (new) The image processor according to claim 28, wherein the reference black is provided by a neutral density wedge surrounding the perimeter of the primary detector array.

30. (new) The image processor according to claim 1, comprising means for chaining the detector arrays in groups separately chained in different orientations to provide a multi-resolution structure.

31. (new) The method according to claim 16, comprising limiting or preventing opponent detector saturation using the reference black surrounding the perimeter of the primary detector array.

32. (new) The method according to claim 31, wherein the reference black is provided by a neutral density wedge surrounding the perimeter of the primary detector array.

33. (new) The method according to claim 16, comprising chaining the detector arrays in groups separately chained in different orientations to provide a multi-resolution structure.

34. (new) The image processor according to claim 1, comprising a reference illumination spot aimed at a sample point within the primary detector array to measure the induced oscillation.

35. (new) The method according to claim 16, comprising measuring the induced oscillation.

36. (new) The image processor according to claim 10, wherein the extracted information is a measure of the local contrast and/or local velocity to provide for spatially adapting the sensitivity threshold of the primary detector array in real-time.

37. (new) The method according to claim 24, wherein the extracted information is a measure of the local contrast and/or local velocity to provide for spatially adapting the sensitivity threshold of the primary detector array in real-time.